

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

BIRMINGHAM AND THE BLACK COUNTRY—No. VI. THE BLOOMFIELD IRONWORKS.

The last article concluded with a description of the mills at the Bloomfield Works proper. Near No. 5 forge there is a small vertical engine, having a cylinder 14 in. in diameter, and working a stroke of 2 ft. 6 in. Driven from this are two roll-turning lathes, a large boring or turning lathe, and a punching and shearing machine, in which the boiler-plates used for repairing the works boilers are prepared. This latter engine does not, of course, work all these machines at the same time, for it is not necessary, consequently when one is at work the others are standing. The steam for the engine driving this machinery is supplied from No. 5 forge engine boilers. A small high-pressure beam-engine, having a cylinder 10½ inches in diameter, and working a stroke of 2 ft. 10 in., drives a roll-turning lathe, situate near the guide-mill. The steam for this engine comes from No. 2 forge engine boilers.

The Factory Works are the next in point of size to the Bloomfield Works proper, and are situated some few hundred yards from them on the outskirts of the town of Tipton. Two forges and a merchant-mill, comprise these works. In the first forge there is a beam-engine, having a cylinder 33 in. in diameter, and working a stroke of 7 feet; 65-horse power. Two boilers supply the steam. A large helve, a forge train consisting of two sets of rolls, and a pair of shears are driven from the above engine. There are thirteen puddling-furnaces and one ball-furnace. The merchant mill is driven by a condensing beam-engine, having a cylinder 37½ in. in diameter, and working a stroke of 7 ft.; 84-horse power. The steam is supplied from three large boilers. Besides the merchant-mill there is a "bull-dog" crushing-mill, and two pairs of shears. There are two heating-furnaces. The second forge engine has a cylinder 18½ in. in diameter, and works a stroke of 3 ft.; 15-horse power. One boiler provides the necessary steam. This is a high-pressure beam-engine, and it drives a large helve and a roll-turning lathe. There are twelve puddling-furnaces.

The Tipton Green Works are situated almost in the centre of the town of Tipton, and in them there is a forge and a merchant-mill. A condensing beam-engine, having a cylinder 30 in. in diameter, and working a stroke of 4 ft., drives the forge machinery. Three boilers supply the steam. The horse-power of the engine is 64. In the forge there is a large helve, and a forge train, consisting of two sets of rolls. There are also twelve puddling-furnaces, and one ball-furnace. A high-pressure beam-engine, having a cylinder 20 in. in diameter, and working a stroke of 2 ft. 8 in., drives the merchant-mill and two pair of cropping shears. The horse-power of the engine is 28. There are two heating-furnaces.

At the Bloomfield Works proper there are two foundries, in which the castings are made for the works. The iron is melted in two air-furnaces, one to each foundry. There is also a small wrought-iron cupola, but it is seldom or ever used. A small staff of engineers or fitters are kept at these works, who do all the necessary repairs. A fitting-shop is erected, for the convenience of these men, in which there are several excellent machines. There is a planing-machine, three lathes, two of them screw-cutting, two drilling-machines, and a screwing-machine. The whole of these are driven by a small vertical engine, having a cylinder 8 in. in diameter, and working a stroke of 1 ft. 3½ in.; horse-power, 3. The steam is supplied from one small boiler. In the stables are two small coupled engines, having cylinders 8 in. in diameter, and working strokes of 1 ft., the steam coming from one boiler. These are used for cutting chaff, and for raising cast-iron balls, by which old castings are broken, so that they may be used in the air-furnaces.

From the particulars we have given it will be seen that there are 18 steam-engines, 38 boilers, 8 forge trains, 9 helves or hammers, 95 puddling-furnaces, 10 rolling-mills, and 20 heating-furnaces, besides other machinery and erections, all employed in the manufacture of wrought-iron; and, as before stated, the quantity of iron that can be produced weekly is 1200 tons. Charcoal iron is made at Bloomfield, and for this purpose there are two furnaces, in which the scrap-iron used is heated with charcoal, stimulated by blast, and afterwards taken to the hammer, to be shaped into a bloom.

The gas used on the premises is made at the works, a small complete apparatus having been built for that purpose. The Bloomfield works have been built piecemeal, and the greatest efforts have been made to economise space, so that they are somewhat irregular, and yet are so well managed, that when in full operation the slightest confusion is not discernable. The order in which the machinery is kept is creditable to all concerned, for although this is one of the oldest ironworks in South Staffordshire, it cannot be branded with the stigma so often placed upon the works of this district. It is a common occurrence upon entering works, that have not stood half the time those of Bloomfield have, to find the engines out of truth, with the brasses all loose. Anything that can work will do. The proprietors do not seem to regard the extra power they have to supply to overcome the unreasonable amount of friction, as the steam is generated in furnace boilers heated by waste heat or gases of the puddling or heating furnaces. Then, as to the other machinery, the gearing is rough and heavy, no attention having been paid to the fitting of it, the rolls are mostly out of line, and the necks of them oval, the standards or housings skewed and shaky on the bed-plates, and the rolls joined together, with coupling-boxes and spindles fitted together, in the worst possible fashion.

This is a true picture of many of the South Staffordshire iron-works, and we have to congratulate the Messrs. Barrows that their works, although classed amongst the oldest in the district, are kept in admirable order. It shows what can be done, and there is no doubt that great benefit is derived from this orderly system, for it is impossible to get on smoothly with the work, and turn it out true, when the machinery is so bad, and in many instances 50 per cent. of the power supplied has to be exerted to turn the machinery alone.

In these works there are several horizontal boilers, heated by the furnaces; they are a great improvement upon the vertical boilers, which are too large in diameter; in them most of the heating surface is vertical, and therefore not near so effective as horizontal surface. Then as to safety: the horizontal boilers are much easier examined or

inspected; and this is very necessary, as furnace boilers are subjected to high and very variable temperatures.

COLLIERIES IN DURHAM AND NORTHUMBERLAND, THEIR WORKINGS AND MACHINERY.

STELLA COLLIERY.—The Stella Coal Company (Messrs. Addison Potter and Partners) have here two establishments at which coal is raised—the Addison Pit and Emma Pit—of which Mr. J. B. Simpson, one of the partners, is the mining engineer. The royalties attached to the colliery are about 5000 acres in area; the chief one, known as the grand lease royalty, has been worked for several centuries in the upper seams. There still remain large areas of the Townley, Five-quarter, and Brockwell seams yet unworked. The great 90-fm. dyke runs through the royalty, and has been proved to be only 60 fms. of downthrow to the north at this point of its course, whereas at Gosforth Colliery, about six miles eastward, the throw is ascertained to be about 170 fms.

The ADDISON PIT is situated at the dip side of the property, and in proximity to the Newcastle and Carlisle Railway. The plant has been erected about seven years, and comprises a winding-engine, pumping-engine, ventilating fan and engine, eight screens, work-shops, gasworks, and coke-ovens, &c. In putting down new plant the most approved form of engines should be adopted, keeping in view efficiency and economy; the same principle should be applied to the particular means of ventilation adopted; this guiding rule has been followed at Stella, and attended with very satisfactory results. The Addison coal pit is 10 ft. in diameter, 47 fms. in depth to the Brockwell seam, and is the means of ingress for air. The pump-shaft is 8½ ft. in diameter, 20 yards distant from the former; it is closed at the top, and serves as the return air-pit to the ventilating-fan. The winding-engine has one 24-in. horizontal cylinder, 5 ft. stroke, direct-acting, 12-ft. cylindrical drum, fly-wheel and foot-break on under side, two eccentrics, slot link, and slide-valve. The cylinder is enclosed in a metallic jacket; the latter is covered with felt and cleading. This engine was made at Elswick Works in 1864; it raises about 480 tons of coal per day, from a depth of 47 fms., with two-decked cages, two 6-cwt. tubs in each cage.

The pumping-engine is a direct-acting, condensing, three-valved, Bull engine, of 52½-in. cylinder, 7½-ft. stroke, 20 lbs. steam pressure, acting on the under side of the piston; a vacuum of 12 lbs. is maintained. The cylinder has a metallic jacket; the steam, equilibrium, and exhaust valves are double-seated. The engine is from Messrs. J. Musgrove and Son's Works, Bolton. Water is raised in two lifts from the depth of 60 fms.: the lower lift is 20 fms., 20-in. bucket; the upper lift is 40 fms., with 20-in. forcing-ram, 7½-ft. stroke. The engine goes day and night, at the average rate of 2½ strokes per minute, raising about 250 gallons per minute; the quantity does not vary much in the different seasons. A jack-engine, with 9-in. horizontal cylinder, shear legs, main and tail crabs, are erected for occasional use with the pump-work. Three Cornish boilers are fixed, two of which are in use at one time, 30 ft. by 6 ft. in shell; tube, 3 ft. at the fire, and 2 ft. 6 in. beyond; these supply the four engines (including the fan-engine) with steam, at 40 lbs. pressure. The boilers are completely covered with sand, 1 ft. deep at the crowns, and are roofed over; they afford remarkably economical results in fuel, boiler space, and labour, in comparison with most North Country boilers, in which a reckless expenditure of fuel, caused in many instances by its cheapness, and a disregard for the preservation of the boilers, and of saving steam after it is generated, is the rule. This discredit to engineering it would be well to have amended at once. The ventilator for the mine is a Guibal fan, 16 ft. in diameter, 4 ft. in width; it is placed 8 yards from the pump-shaft, having an arched passage of communication, 36 ft. in area; the fan is driven usually 50 revolutions per minute, producing a circulation of 36,000 cubic feet of air in the mine, with ½-in. water-gauge. The driving-engine has one 8-in. vertical cylinder, 15-in. stroke, direct-acting, one eccentric and slide-valve; 2-in. steam-pipes are brought to a receiver near the engine, both receiver and cylinder are felted and cleaded. The fan and engine have been in operation five years, without cessation in their work, excepting an hour or two at the end of each week for cleaning or repairs. No attendant is required.

Three seams of coal are worked at Stella—the Townley seam, at 15 fms. depth, consisting of Cannel 6 in., coal underneath 3 ft. 8 in., producing gas-coal; the Five-quarter seam, found at 30 fathoms, is 3 ft. 8 in. in thickness; the Brockwell seam, found at 44 fms., is 4 ft. 2 in. in thickness, including 9 in. of splint at the bottom, which is separated from the other coal for steam purposes; the two latter seams are sold for gas or house purposes; the small coal of the three seams is mixed together for coke-making. There is but a slight production of gas from the coal in these mines, so that there is no cause for anxiety on that head. The coal is worked altogether on the bord and pillar system; the pillars are sometimes made 30 by 10 yards, in other cases 20 yards square; the latter are worked away by 5-yard lifts from the walls. Lamps are used only in pillar working; in the Townley seam this is not required. The rise of the measures is about 1½ in. per yard westward from the Addison pit; there is a similar rise eastward from the Emma pit, forming a ridge about midway between them, but the general rise of the measures is here (as it is further south) westward. The conveyance of coal underground is effected by ten self-acting inclines, and 22 horses. The coal from the upper seams is dropped down to the Brockwell seam. At the bottom of the pit, and along the principal roads, gas lights are placed.

The headstead and screens are of wood, the platform being 21 ft. above the rails. Eight screens are erected, which are inclined alternately in contrary directions, thus economising space. The coal is separated into the two classes—large and small. Four lines of rails are required under the screens; the empty wagons are taken up beyond the screens by a tank locomotive, with 9-in. cylinders; they fall by their gravity to the different lines, as required. One hundred and forty-four coke ovens are built near the Addison pit, in double rows, dome shaped, 11½ ft. in diameter, with main flues and eight chimneys, 60 ft. in height. With the exception of ten these are all patent bottom-flued ovens, having nine flues in each; this form of oven has been in operation here four years. The ovens are charged at the door. The coke is drawn by hand. About 1200 tons of coke is produced per week; this is sent to the Harrington and other Cumberland works

for Bessemer steel manufacture. The coke contains only 2.75 per cent. of sulphur, and about 5 per cent. of ash.

EMMA PIT.—This is situated 1½ mile west from the Addison pit, and is 11 ft. in diameter, 68 fms. in depth to the Five-quarter seam; coal workings commenced in 1844. The pit is divided by wood brattices into two sections; the larger (7 ft. of the whole) is for coal work, and the inlet for air; the smaller section is appropriated for the pumps, and is the ventilator for the Townley and Five-quarter seams, being heated by a furnace near the bottom of it. The winding-engine has one 24-in. vertical cylinder, 5-ft. stroke, cast-iron levers, two eccentrics, slot-link and slide-valve, 11-ft. cylindrical drum and fly-wheel; these are supported on one side by wood framing; the cylinder is felted and cleaded. About 450 tons of coal is raised per day from the levels of the Townley and Five-quarter seams respectively, with two-decked cages, two tubs in each cage. The pumping-engine is a double-acting non-condensing double beam engine, with 44-in. cylinder, 6 ft. 8 in. stroke, four double-beat valves, worked by two cataracts and four weigh bars or spindles; the cylinder is felted and cleaded. An elevated pumping-beam extends from the pit to a staple sunk under its back end; a connecting-rod from the outer end of the main beam attached to the back end of the pumping-beam gives motion to the latter. Water is raised in two lifts from the depth of 70 fms.; the lower lift (in the pit) is 35 fms., 18-in. forcing ram; the upper lift (in the staple) is 35 fms., 18½-in. bucket; the stroke in each lift is 6 ft. 8 in. This engine goes day and night at the average rate of six strokes per minute, at 75 gallons per stroke, the delivery will equal 450 gallons per minute. During 24 hours the engine will raise 64,800 gallons, or 2880 tons, of water, equal six times the weight of coal raised. Two Cornish boilers, 30 by 6 ft., and three plain boilers, 28 by 5½ ft., supply three engines (including a wagon engine) with steam at 35 lbs. pressure; these are roofed over, the plain boilers will be replaced by Cornish boilers. An engine, with 9-in. cylinder and vibrating beam, is used for hauling wagons from the bank foot up beyond the screens, from which they descend by gravity on the different lines of rails to the screens; this is also used as a jack engine. Main and tail crabs and shear legs are erected for pump work. Eight screens are erected; these are inclined in contrary directions alternately. The underground conveyance of coal is effected by 10 self-acting inclines and 18 horses. There are small workshops and gasworks at this pit; at the bottom of the pit gas light is used. A granary also is erected, containing a mill for crushing oats, beans, peas, and maize, used for horses' food; the mill is driven by one of Clayton and Shuttleworth's portable engines. The coal from the Emma pit is conveyed by the Stella Coal Company's private line of two miles to Stella staiths, where it is shipped into keels, to be afterwards transhipped into larger vessels; it is sent also by public railway to the docks at Jarrow and other places.

THROCKLEY COLLIERY.—The present coal pit, 12 ft. in diameter, and pump-shaft 9 ft. in diameter, were commenced sinking in 1867, and coal work in 1869. They were sunk through the Townley, Main Coal or Five-quarter, and the Brockwell seams, all of which are now worked and raised from their respective levels; the pits are 56 fms. in depth to the Brockwell seam. The Throckley royalty is about 1000 acres in area, and is leased from the Lords of the Admiralty. After considerable working of the Townley seam by the old miners it had been suspended for upwards of 100 years, until its resumption in 1867 by the Throckley Coal Company (Messrs. Spencer, Stephenson, and Company), with Mr. J. B. Simpson, one of the partners, as chief engineer. Leases of this coal field are still preserved, dating as far back as the year 1600. From its proximity to the River Tyne, and the slight depth of the upper seams, this was probably one of the earliest coal mines worked for the shipment of coal to London and the coast. There are numerous old pits on the property. On the reopening of the mines by this company, four years ago, some persons confidently asserted that no coal would be found; however, the pits have been put down, and after much difficulty with the feeders of water, large tracts of pillars and some whole coal have been found of excellent quality in the Townley seam. The main coal was found only partially worked, and the Brockwell seam entire. The pits were fortunately put down through a piece of solid coal in the Townley seam, and as the old workings were known to be filled with water the explorations in the coal were made in the first place cautiously by boring, with three bore-holes in each leading place, in the ordinary manner; the water by this means was tapped and discharged in regulated quantities suited to the capabilities of the pumping-engine. The old pillars in the Townley seam are found 20 yards by 6 or 7 yards in width; the bords 3 to 4 yards in width; these are mostly standing open, without signs of "creep," which may be accounted for by the slight depth of superincumbent strata and the pressure of water so long accumulated in the workings.

The winding-engine has two 18-in. horizontal cylinders, 4-feet stroke, direct-acting, four eccentrics, slot links, and slide-valves, 10½-ft. cylindrical drum. About 250 tons of coal is raised per day, with two-decked cages, two 6-cwt. tubs in each cage; but this quantity will soon be much increased as the mines are developed. The pumping-engine is one of the patent overhanging beam-engines, by A. Barclay, Kilmarnock. The cylinder, placed on the side of the pump-shaft, is 70 in. in diameter, 8 ft. 4 in. stroke; the beam, of wrought-iron, is supported on a vibrating pillar at one end, and projects over the cylinder at the contrary end, giving a stroke of 10 ft. in the pumps. The engine is single-acting, the pressure acting on the under side of the piston. The cylinder is enclosed within 9-inch brick wall, and 4 inches of clay within the brickwork. Water is raised in two lifts in the pit; the lower lift is 25 fms., 14-in. bucket, the upper lift is 44 fms., and 25-in. forcing-ram; it makes 2½ strokes per minute in day-time, and 3½ strokes in night-time. While draining the old workings its rate of going was 6 strokes per minute; on the calculated quantity of 212 gallons per stroke, the delivery would be 1272 gallons per minute.

The ventilator for the three seams is a Guibal fan, 18 feet in diameter, 4 ft. wide, which is driven by a 9-in. horizontal direct-acting engine, with one eccentric and slide-valve; the fan makes 36 revolutions per minute, producing a circulation of 36,000 cubic feet of air per minute; the pump-shaft, closed at top, is the return air pit in connection with the fan. These engines are supplied with steam at 35 lbs. pressure from four Cornish boilers, 30 by 6 ft. in shell; these are covered with pounded clay and roofed over. The boiler-feeders are 8-inch inverted cylinders, with 6-in. ram. Two firemen are employed by day, one at night time. The crab-engine has one

12-inch horizontal cylinder; it operates very powerfully on the drum by means of three motions of pinion and spur-wheels; the increase of power is in ratio of 1 to 36. Drum 6 ft. in diameter, which can be disconnected by a clutch and two other cog-wheels. The iron wire-rope used is 1½ in. in diameter; 22 coke ovens of the ordinary kind are built near the pit, of the dome shape, with main flue and chimney. Coal and coke are conveyed by the old Wylam Railway to Lemington staiths, where they are put into keels to be transhipped again below Newcastle into large vessels.

The Wylam Railway has been used for a very long period in the conveyance of coal from Wylam and other places. In 1813 Mr. Blackett showed the locomotive principle of traction to be practicable by trials on this railway, and locomotives on the Killingworth principle were afterwards adopted on it. A new railway is projected from Scotswood to Wylam, which, if carried out, will enable coal from this colliery to be shipped at Jarrow Docks.

THE LATE COLLIERY EXPLOSIONS.

SIR,—A witness having admitted in evidence at the inquest that a lamp must have been opened by a duplicate key to fire the shot which ignited the gas has induced me again to call the attention of colliery owners to my *Magnetic Lock*, which cannot be opened by the men. Lamps having this lock have been in full use at the Harecastle Colliery for the last nine months, and given the greatest satisfaction, and the men also now highly appreciate them, being impressed with the fact that they are put into their hands for their own safety.

Every information respecting these lamps will be readily given on application to the manager of the above collieries, to Mr. John Davis, lamp-maker, All Saints Chambers, Derby, or to myself.
Graving Docks, Victoria Docks, London. S. P. BIDDER, Jun.

THE RECENT COLLIERY EXPLOSIONS.

SIR,—In last week's *Mining Journal* there is an article on the explosions in Derbyshire and Staffordshire, containing several statements to which practical miners will altogether object. First, it is said, "In each case the firing of a shot preceded and led to the explosion." Now, the shot might precede, but as to the actual blast or fire of the shot, whether fast or loose, lighting the gas, we disbelieve. Also the theory advanced by Mr. E. Bainbridge, that "the blast caused by the expansion of the air through the firing of the shot was sufficient to fire the gas in a locked lamp." In practice we find it will do no such thing 60 to 80 yards away from the shot. For more than 20 years have we been in the constant use of powder, in coal and all kinds of strata surrounding it, but have never been able to light gas from the fire of a shot. Nor do the most heavy shots produce any serious expansion of the air a short distance off. You mention duplicate lamp-keys; the majority of the locks on the present lamps are a mere farse, any pick point, or the hook of another lamp, or a common small nail, is a key sufficient to lock and to unlock most of them, and are used almost daily at most places.
Walkden, Jan. 24. A MINER.

OIL v. GAS—MR. SILBER'S LAMP.

SIR,—The question of the application of Mr. Silber's contrivances for lighting (as explained in the *Journal* of Dec. 3 and 31) continues to occupy the attention of the public journals and of scientific men. The process in Mr. Silber's counting-house is satisfactory to observers, but various practical difficulties are suggested, which may yet have to be encountered elsewhere. One of these is the question of uniformity of oil, and it may be said on uniformity of good quality of oil the success of a simple but delicate process depends. Unless a uniform good oil can be supplied, then the expected steady, clear light cannot be obtained, and the apparatus will be disturbed by the occasional use of inferior oils. Now, to use inferior oil will really render the use of the lamp impracticable, because an inferior mineral oil means a nuisance, to which few persons will subject themselves in a house.

Mr. Silber himself has been so far successful with oils used by him, on account of his extraordinary care in their selection; but it appears that absolute uniformity may be secured by the use of Messrs. Houghton and Howell's oils, manufactured by their patent process; and it is acknowledged that if a sufficient quantity of these can be obtained, then there must be a great extension of improved lighting.

The demand for the purified oil does not depend on Mr. Silber's or any other apparatus, but the success of such apparatus is ensured the moment it is ascertained that purified and uniform oils will be available. It is said that this desideratum is likely soon to be realised, as Messrs. Houghton and Howell's patented processes for the manufacture of petroleum will shortly be brought before the public; and such is considered to be the fame of the oils, both in England and America, produced by their improved mode of distillation, that orders, to an extent apparently unparalleled, are continually being pressed upon them for their burning and lubricating oils.

Mr. Silber's, or any other lamp which shall eventually lead to the general use of carbon oils, from which the poisonous compounds of arsenic and sulphur, in all their nauseous combinations, are thoroughly separated and removed by Messrs. Houghton and Howell's process, will not only be of great importance in a commercial point of view, but will also largely benefit the public health, which is too often gradually and insensibly undermined by the inhalation, in confined places, of those pestilent products of combustion.
London, Jan. 26. T. H.

NEW STEAM-STAMPER.

SIR,—In the *Mining Journal* of Dec. 4 a paragraph appeared setting forth generally the merits of a new steam ore stamp, stated to be the invention of Messrs. Chatwood and Sturgeon, and for which the Royal Cornwall Polytechnic Society had awarded those gentlemen their first-class silver medal; and as those gentlemen are only the manufacturers, and are not the inventors or designers of the same, I beg you will insert this my correction of your report upon that point, observing that I am prepared at any time to prove from the correspondence of those gentlemen that neither of them either invented or designed the present new Steam-Stamper; and by other indubitable evidence that before either of them were made acquainted with any details, or the objects of the invention, the same had been matured and provisional registration effected.

You are, I presume, aware that an illustration of the same Steam Stamper, accompanied by a descriptive detail thereof, has since appeared in the *Engineer* of Jan. 6, to which I have been compelled to address myself, as I am not disposed to be ignored as well as deprived of my patent right, and also denied the honour where honour is due. It is hardly necessary to observe that the patent of those gentlemen is an invalid one to all intents and purposes, instead of, as it might have been, a most valuable one to all parties concerned.
London, Jan. 18. WM. SYNNOCK.

STEATITE.

SIR,—Noticing your reply to "H. G." (Walworth), in last week's *Journal*, respecting this (what I find a scarce) mineral, and being acquainted with Mr. Edmund Spargo I have more than once visited his quarry, which is situated on the island of Holyhead, about two miles from the Valley station, and in proximity to the great deposit of serpentine rock, in the parish of Rhoscolyn, so well known to geologists. This appears to be the only deposit in the island worth working. The quality, I understand, is of the finest description. I happen to have some pieces by me. I send you a sample of the stone, and also some in a fine powdered state, obtained by me from the sample stone sent. This deposit is so extensive that it can be quarried, carted, and delivered in railway trucks at Valley or at Valley port for about 3s. 6d. per ton. Mr. Spargo, to my knowledge, has during the last two years sold to one Manchester firm alone upwards of 200 tons. I understand the price per ton, as obtained from the quarry, varies from 2l. to 2l. 10s. at Valley. I hear, however, that he now contemplates erecting a grinding-mill on the spot. The value per ton of ground steatite of equal quality to the sample forwarded herewith would be from 5l. 10s. to 6l. delivered. Mr. Spargo would have a great advantage afforded him by grinding it, as at present his sales are necessarily confined to millers, who, in fact, reap the greatest share of the profits. Besides this, he would then be able to go to the market with the manufactured article; and as his quarry is probably more con-

veniently situated for transit either by sea or by rail, and the deposit itself equally or perhaps more extensive than any in Great Britain, he has great advantages over most places. Indeed, I never heard of any other in Wales of any importance; and I understand the deposit at Lizard Point, in Cornwall, is very limited, and found in small contemporaneous veins. Mr. Spargo could easily raise 300 tons a week, or even more; therefore, when he gets the mill to work I see no reason why he should not be able to supply the principal demand, and in fact secure the entire monopoly.

In addition to the uses of steatite named by you, the greatest amount is used in cotton factories for sizing, diminishing the friction of the machinery, polishing serpentine, marble, gypseous alabaster, in anti-attrition pastes, and in the manufacture of the best fire-resisting crucibles. As a cement it is used for lining iron safes and many other purposes. Mr. Spargo deserves every success; in fact, there can be no doubt as soon as he gets the grinding machinery up a most extensive sale will readily be found for it.
R. L. I.
Anglesea, Jan. 25.

DYNAMITE.

SIR,—Some of your readers may like to have a practical opinion on the use of Dynamite for underground mine workings. I have recently had this explosive tried at two mines, and I have just received from one of the mine captains the following report:—

"We have found it to be of great advantage in wet ground. It is much more powerful than powder, and water does not seem to affect it. In a mine so well ventilated as ours is, the noxious gas will do no injury. The men tell me that if they go in quickly after blasting they get a headache, so that I do not think it would answer well in a close mine."

This report seems to me to establish the superiority of Dynamite over gunpowder for mining purposes in those mines where the ventilation can be made sufficiently effective.
J. G. B.
London, Jan. 25.

MINING IN NEVADA AND CALIFORNIA.

SIR,—I was pleased to see in the *Journal* a letter from Mr. J. E. Bowe, with reference to the mine in Nevada formerly known as the "Bateman" Mine, to purchase which a company was formed here in the early part of last year, under the name of the "Champion" Company, by Mr. George Batters, but which, however, was allowed to fall through by sundry wisecracks, who preferred the testimony of a Cornish mining captain before that of men resident on the spot, and thoroughly conversant with the different characteristics of Nevada silver mines. The following paragraph, from the *Virginia City Enterprise*, will show what the mine—now called the "Eureka Consolidated," and owned by San Francisco capitalists—is doing:—

"The *Eureka Chronicle* of Dec. 17 gives the results of the working of the Eureka Consolidated Company from Dec. 1 to Dec. 15—fourteen days. The amount of 428 tons of ore were taken from the mine and smelted at their furnace, producing 146 tons of bullion, valued at \$420 per ton. The total cost was \$9130, leaving a net profit of \$53,190."

A profit of 10,000% as the result of 14 days' work is not a bad return, especially when it is remembered that the mine is doing this month by month. It is, in fact (with the exception of my old love, the Chollar Potosi Mine, of Virginia city, which is distributing dividends to its shareholders of 27,000% per month), making larger profits than any mine on the Pacific coast. When will people learn to apply to mining matters a little of the common sense which they exercise in their ordinary business transactions? This is not the only instance by many of Cornish miners (good and reliable fellows they may be in their own country) being sent abroad to a country of which they know nothing, to report on gold and silver mines, of which they know still less, and this with hundreds of thousands of pounds depending on their fiat.

Mr. George Batters may fairly place the Eureka Consolidated to his credit, along with Van, Chiverton, and Sweetland Creek; and, by-the-way, I, claiming to know something of the uncertainty of mining speculations, venture to think that these three make a pretty good set-off against this much-abused gentleman's one failure—the Pacific Company.

A large amount of English capital—probably not much under a million sterling—is now invested in Mines on the Pacific coast. The largest amount is in the—

EBERHARDT and AURORA, of which I have written in previous letters, and of which I hear that they are raising considerable quantities of good ore, ready, in California parlance, for a big "splurge" when the mill starts. They have also purchased another mine in White Pine, and one, too, that is turning out rich ore. The worst thing about the White Pine district is that the rich chloride ores are apparently superficial—so all my letters from men who have operated largely in the district tell me. It must be remembered by those who form extravagant notions as to what the mines will produce that they were only discovered about three years ago. During those three years the mines have risen to their zenith, any amount of capital has been devoted to their development, very rich ores have been taken out—the Eberhardt itself having been at one time almost an Aladdin's palace—and to-day the district once so populous is, by comparison, deserted, and nine mills out of ten (to quote a letter recently received from there) are lying idle. However, the company is under most able local management, for if George Attwood cannot make a mine pay nobody can.

SOUTH AURORA.—Most of my remarks as above will apply to this company also. I must, however, confess that it is to me a bad sign when vendors, asking a large sum in cash, are afterwards ready to accept all they can get. They may prefer shares, but—Well, least said soonest mended, as the old proverb says.

SIERRA BUTTES.—This is, without exception, the finest and most permanent property on the Pacific coast which has yet fallen into English hands. Everything will depend upon the management, as the auriferous quartz is of low grade, but apparently inexhaustible. I have seen no reports published here, the company being, I believe, a private one. What I write is simply what I hear from California.

SWEETLAND CREEK.—A small, steady concern, which has already got into the dividend list, and which is likely to keep there for many years to come, if properly managed. The class of mines of which this is an example, called hydraulic mines, must eventually meet with great favour here. Cent. per cent. (and ephemeral) profits need not be looked for, but regular 10 to 30 per cent. dividends, varying with the richness of the gravel, the supply and cost of water, and general accessibility of the deposits.

ECLIPSE.—Wonderful news comes from this mine, but as I have so often seen in the gold lodes of California little rich auriferous bunches in intrusive cross-bunches (they cannot be called cross-courses) of greenstone, here to-day and gone to-morrow, and as I never attach the slightest importance to assays of samples, the least I say about this mine the better.

PACIFIC.—Who shall say that "resurgam" is not written here. Meanwhile, according to all accounts, they are being done "brown."

TUOLUMNE.—On July 23 last I wrote you concerning this mine:—"Take for instance the assays from the mines of the Tuolumne Company—mines of which I know absolutely nothing,—put those assays (all perfectly true without doubt from the samples sent home) before any Californian in his sober senses, and see what he will say."

The result of the first run was, if my memory serves me, \$7 per ton—a wee egg out of so muckle a bird. My chickens seem to be coming home to roost sooner than I expected.

Two new companies have also appeared within the past few days—the "Atlanta Silver Mining Company" and the "Birdseye Creek Gold Mining Company."

The *Times* having brought its superior "intelligence" to bear upon these two embryo companies, I almost fear that in saying a word or two I am trespassing upon forbidden ground. First as to the—

ATLANTA COMPANY.—The names attached to this company's prospectus are those of gentlemen who no one can for a moment suspect would put before the public what they did not themselves believe to be true. The question arises whether they are not allowing themselves to be led astray by wonderful tales and wonderful assays. Again the Cornish mine captain crops up. It is a long price for a mine, and a mine, too, possessing such a peculiar fascination for a San Francisco capitalist,—on which point more anon.

BIRDSEYE CREEK is not such a pretentious concern, but it has this much in its favour—that it is endorsed by men who are well acquainted with the class of mines proposed to be purchased, and whose opinion I at least, as an old Californian, would value more than that of all the English mining engineers put together.

The remarks I have made about Sweetland Creek apply with doubt

force to Birdseye Creek, as I understand that at Sweetland their water is costing them \$3000 a month, while at Birdseye their water will cost them nothing, and the latter has seventeen claims to the former's three or four.

THE "TIMES" ON FOREIGN MINES.—Before I conclude, one word in answer to the question put by the *Times* as to the reason why good mineral properties are brought to this country for capital to work them; and I will not do as the *Times* does in to-day's issue—quote the "rigging" carried on in Joint-Stock San Francisco companies in Nevada silver mines as a peg whereon to hang remarks on California gold mines, but will simply make a remark or two from my own experience in California.

1.—It is almost an impossibility to get a San Francisco capitalist to look at a gold mine in California, much less to buy it, unless it has a reputation such as is possessed by about half-a-dozen mines only in the whole State. Anything at a distance, no matter how far or how inaccessible, your San Franciscan will rush madly into, but a concern close under his nose at home—no; and any Californian will bear me out in this.

2.—You, a Californian, want to borrow money to work your mine, believing you have a good one—5 per cent. per month for the money. Who can stand that? And I have paid that rate on the Pacific Coast for the San Francisco company I represented month by month, on an advance of over \$100,000, and glad to get it at that.

3.—Your San Franciscan when you do persuade him to embark in a mine must see, or fancy he sees, dividends of 5 per cent. per month. We in this country are satisfied with 1 per cent. per month on a mining venture; so sometimes what is good for a Californian to sell is good for an English company to buy. The finest gold mine in California—aye, in the world—the "Eureka" of Grass Valley, was offered in London a year ago. It was paying good dividends then, but since that time it has paid only from 6000l. to 10,000l. a month dividends, and it was offered here at 250,000l.—about three years' purchase, and with over three years' reserves in sight. According to the *Times* principle, this was also a swindle.

There are plenty of magnificent properties in California yet to be purchased by English capital, the *Times* notwithstanding.
London, Jan. 25. P.

USE AND ABUSE OF THE TELEGRAPH—TAQUARIL MINE.

SIR,—We have lately received the following Telegram from the Taquaril Mine:—

"Staff so far treated at stamps not rich; produce for month will, perhaps not realise expectations."

Now, Sir, the effect of this message has been the depreciation of the value of the mine from 50,000l. to 60,000l. Many of the shareholders were much alarmed, and sold their shares immediately, thinking the previous reports of the great richness of the mine were mere fiction, and that the truth of the matter was now coming out. Others imagined that they were stamping the debris from the old mine, which appears to be the correct version.

I think directors should instruct their agents to be more explicit in future when favouring us with telegrams. Mining shares fluctuate quite enough from the varying prospects of the undertakings, without the transmission of vague reports.
A SHAREHOLDER.

TIN IN MUNDIC.

SIR,—Since I wrote to you my letter upon "Tin in Quartz and Tin in Elvan" my attention has been called to several notes in the *Journal* concerning the presence of tinstone in mundic in certain districts in Cornwall. This appears, from all accounts, likely to prove as great a discovery as those alluded to in my former letter. During the last half-year I have submitted to analysis numerous samples of Cornish tin-bearing mundic, and the results have been highly satisfactory. I can give to those of your readers who are unacquainted with the processes of chemical analysis a simple method by which they can often render the tinstone visible in these cases, especially when the gangue is of white quartz or killas.

About 15 grammes (say ½ oz.) of the coarsely pulverised ore is treated with slightly diluted nitric acid, until the whole of the pyrites is oxidised and dissolved, which at a gentle heat will occur in four or five hours. About half a pint of water, or rather more, is then added to the flask which contains the substance, and by giving a rotatory motion to the liquid and the residue, and then allowing the latter to subside, the heavier tinstone will invariably group itself into a little compact mass at the bottom of the liquid (best seen when the flask is inclined); over it lies the white quartz or green killas, and over this again the sulphur, if any remains undissolved, which is usually the case. When the stone thus treated contains 3 or 4 per cent. of tin oxide this little experiment shows its presence very distinctly. To ascertain its exact amount the ore must be submitted to a very careful assay, and as arsenic is mostly present in notable proportions, it is best to roast it previously to attacking it by the usual dry method.

I cannot help thinking that the discovery of tinstone in the mundic of New Great Consols and Okol Tor Mines will be the starting point of some very interesting and unexpected facts that will tend to explain not only the origin of these deposits in Nature, but why tin is restricted to so limited an area on the earth's surface.

T. L. PHIPSON, Ph.D., F.C.S.
Analytical Laboratory, Putney, S.W.

THE METALS, AND THEIR ORES—No. XV.—GOLD.

SIR,—In article No. XIV. some of the gold-producing countries of the world were mentioned. In the present paper I purpose referring to other equally important districts whence gold is derived. The continent of America at once arrests the attention, on account of its inexhaustible stores of the precious metal found in nearly every region from Cape Horn to Behring's Straits. There are, of course, some localities which are more prolific than others, and it is to these I shall more particularly refer. In South America, Chile, Buenos Ayres, Bolivia, Peru, Brazil, New Granada, &c., are proverbially known as gold-producing countries. In Chile gold is found in the decomposed granites, in quartz veins traversing the granitic and slate rocks, and likewise in metalliferous veins, embedded in the Silurian and more recent formations. Valparaiso, Coquimbo, Chancay, Copiapo, and the burning plains of Atacama may be mentioned as some of the important mining districts of Chile, both with respect to gold and to other metals. The mountains of Peru abound in metallic wealth. In some districts, as those of Patate and Huailas, the gold is obtained from quartz veins traversing the older rocks, whilst in others it is washed from the beds of rivers. In Brazil, and in New Granada and Panama there are important gold regions, and large quantities of the precious metal are obtained by washing the river sands. In North America, Mexico, with its vast quartz veins and "placers" traversing the prolific regions of Guanajuato, Guadalupe, Zacatecas, Guerrero, Chihuahua, &c., produces not only gold but nearly all the other metals in great abundance. Sonora, between Mexico and the Gulf of California, is another gold region but imperfectly developed, where, in default of lead, the Indians are said to make bullets from nuggets of gold. With regard to that marvellously rich auriferous district of California, bounded by the Sierra Nevada mountains on the east, and the Pacific on the west, and following the course of the rivers Sacramento and San Joaquin and their tributaries from north to south, it is needless to write, as from the day the first nugget was found by Sutter, whilst digging the water-course at Coloma, in 1848, the facts and figures relating to California gold digging have been as "household words."

That which has been equally as important to civilisation and to California as gold mining is that which has sprung out of it—the building and peopling of magnificent cities, the cultivation of the soil and growth of corn in regions which but for the gold-seekers might have yet remained a desolate waste. In the United States gold is found in Virginia, on the Rapahannock and Rapidan rivers, and in Stafford County, Orange County, Goochland County, Louisa County, Buckingham County, &c. In North Carolina gold is obtained, as at Mecklenburg, from veins, whilst at Lincoln and Rutherford it is produced from the alluvial deposits. Gold is found in South Carolina, at Lynch's Creek, Lancaster, &c.; also in the State of Georgia, in Habersham and Rutun Counties. In Nova Scotia the districts of Tangier, Wine Harbour, Lawrencestown, Montague, Oldham, Renfrew, Isaac's Harbour, Sherbrooke, Waverley, &c., are ex-

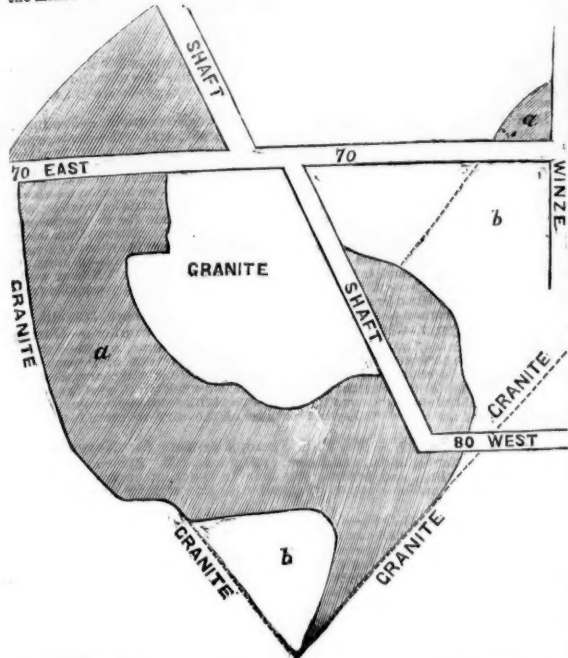
tensively worked for gold, the total production in 1869 from the Nova Scotia gold quartz crushings being about 20,000 ozs., the average produce being about 18 dwts. of gold per ton of quartz.

Mining Offices, Shrewsbury.

EDWARD GLEDHILL.

EAST WHEEL LOVELL.

SIR.—The following plan has been sent to me by one well acquainted with the above mine. It is drawn from actual measurement, and many inspections of the mine:—



a, represents the tin ground taken away—b, what remains to be taken away, and available for future dividends.

It will be observed that the winze sinking below the 70 is rapidly approaching the granite, as the 80 west is driven beyond the perpendicular, and the tin ground is dipping east, or away to the body of which is already taken away. The 80 east, which is supposed to be a level, is a slope, and cannot possibly be expected to continue, the granite having been seen above and below.

If any correspondent will give the shareholders further advice, corroborative or corrective of this plan, I shall feel indebted. The well being of all interested in mining depends upon a full and fair statement of the truth.

H. WADDINGTON.

P.S.—Would any inspecting agent tell the shareholders whether there is in sight two more dividends of 2s. each in (say) the next six months from the last dividend.

EAST LOVELL, AND CAPTAIN PASCOE.

SIR.—Allow me a short space in your valuable Journal to express an opinion on this mine. Captain Pascoe has again and again inspected the property, and with all deference to any resident agent's opinion, any practical miner would as soon be guided by the former as the latter. For the following reasons I would prefer Capt. Pascoe's or any other independent agent's opinion (not being myself on the mine, and able to get at the truth):—

Capt. Pascoe has reported from the first his fears, and given his reasons why the mine could not continue so rich—he predicted the falling out in the bottom of the 80. Did Capt. Quantrell ever report this, and when? Have not his reports universally been of "great improvements," and "the mine looking more lasting than ever?"

Did not Capt. Pascoe tell us that a hard bar of granite came in from the west, and completely cut out the tin, barely leaving the trace of a vein in the bottom end of the shaft; and that the said end, called the 80, is now 2 fms. beyond the perpendicular of the winze sinking below the 70, thereby proving that this winze is all but unbottomed? When has Capt. Quantrell said anything of this?

Does not Captain Pascoe tell us that the 80 east is no level at all, but a slope; and that 8 or 4 fms. above this slope the hard granite has completely cut out the tin, and that the probability of this slope lasting easterly is very small?

Capt. Pascoe and all other independent agents tell us that had not this rich spout of the kettle been found, no dividend would have poured forth for a long time.

The winze sinking below the 70, valued so highly as 700l. per fathom, is very rich for 4 or 5 f. in length, but not the whole length, and is fast dipping east, clearly proving that as the 80 has passed under this, there really is nothing on which we can look with confidence to the future.

At the Puffer shaft they have had a most accommodating lode. About four weeks ago, on an inspecting day, the lode was valued at 20l. per fathom; the following day at 100l. per fathom, the report being received in London on Friday morning. Next inspecting-day (a fortnight from last), the lode is again valued at 20l. per fathom, and inspectors shake their heads when asked if there is any appearance of its having been worth more.

Ought confidence to exist where the bright side is ever painted? Where we hear of no falling off, but where every little improvement is looked at through a large microscope? Where failures are never published, but the ignorant left to their bliss? Is it that the agent himself has no confidence, and hails with delight every little flicker of his night-light, ere it is eclipsed by the exuberance of the disappointed?

My local correspondent, writing on this mine, says, referring to the winze sinking below the 70—"It has come in right good time to save them; and it may do very well for those who know the ropes, but not for outsiders."

The price of shares has ruled high—far beyond their value; so did the South Sea Bubble; so did many bank shares in 1865, all from the same cause—the collapse as certainly is coming. Let those who would not be left behind send a trustworthy agent to confirm or refute these statements. A LOOKER-ON.

Jan. 25.

P.S.—Would anyone interested inform the public whether the water will be in the bottom of these shafts and winzes soon—that is, when the tin is gone? What tin is being sold now? Have the shareholders been told they no longer sell 1 ton per day.

EAST CARN BREA, AND ITS MANAGEMENT.

SIR.—I cannot understand what motive a "Late Shareholder" can have in now interfering with the affairs of this company, unless as the tool of some dissatisfied or unprincipled adventurer, and, as his letter does not contain facts, I beg your insertion of my reply thereto. I have no doubt there are parties who will undertake the management of this or any other mine in this district for a few guineas per month; but, having had some experience in the weaknesses of cheap agents, I would urge upon the shareholders not to be led away by such statements. I know that the secretary has increased his interest in the mine, and think it ought to show the shareholders the great faith he (as the representative of the company) has in the concern. I happen to be perfectly aware of the circumstance under which he has acquired a large stake, and we all should be thankful to him for supporting the mine by preventing wholesale relinquishments, which since the transfer of a large number of shares has unfortunately, but not unexpectedly, been the order of the day. I am assured that Mr. Buckley never had the least intention of obtaining his proportion of the assets, and, on the other hand, he has subscribed hundreds of pounds, and is still willing to prosecute the mine. As to the merits of the mine, I maintain that there is a general feeling in the district in favour of a vigorous development of the property, and upon this point I think the opinion of Capt. Hosking, of Carn Brea, should be taken as conclusive. The great reduction in the number of shareholders heavier calls, but a project is now on foot for bringing new blood into the concern by an issue of all forfeited and relinquished shares, and placing the mine under the Limited Liability Act.

A SHAREHOLDER.

EAST CARN BREA.

SIR.—It is with regret I ask you for space in the Journal to reply to Mr. Laws' letter of last Saturday. I am bound, however, to do so, in justice to those whose interests I represent. It has been my disagreeable duty to contradict Mr. Laws time after time, in open meeting, so much so that I have come to the conclusion that the two long words, "unscrupulous" and "insidious," are so essentially the elements he has found answer his purpose, that in the brilliancy of his intellect he confuses an open and fair expression of an opinion and intention as "insidious." What are the facts in Mr. Laws' possession? The disgrace of this management. Ask any local authority. I have heard, and know it. The first meeting I attended was on June 24 last. The number of shares was 2711; the relinquishments sent in in the previous six months were—W. A. Thomas, on behalf of John Thomas, 100; C. J. Furlonger, 70; Alfred Lanyon, merchant, Redruth, 20; John Michael Williams, banker, Redruth, 50. The present number of shares is 2374. I deny his assertion that the report of Captain Hosking was obtained in the interest of the mine; it was in the interest of Mr. Laws and the secretary. The report itself is nothing but what was known before, and if people consider, the facts condemn the mine conclusively. As to Mr. Laws' imputation of motives, I treat it with contempt. That my shares cost little I admit, but that little was all too much, amounting to some hundreds of pounds, alike valueless when I bought as they are now.

As to Wheel Union, this mine was purchased at a general meeting in Dec., 1868, for the sum of 4800. The shareholders present represented 331 shares out of 5310. How many of the vendors were buyers will probably be known shortly through the Stannaries Court. Cost is incurred in Wheel Union, and the shareholders of East Carn Brea are paying it. Can any number of shareholders compel those who never agreed or signified their assent to increase their risk and loss? Certainly not; it is so well known, and patent to everyone, but the unscrupulous and insidious.

Cost was incurred in bringing up captains and clerks to attend the meetings

who would be much better employed in attending to their duties at the mine. Mr. T. B. Laws has been in Cornwall canvassing for proxies to prevent my cleaning this Augean stable, and to substitute an intelligence that can comprehend simple matters of fact without overestimating perverting them. Who pays his cost? Who sent him? Has any secretary a right to canvass for proxies? This will shortly be answered in another mine. I gave Mr. Laws notice of my intention to take away from his office everything in which I held a large interest as soon as such intention was formed. I adhere to it, and will openly and fairly fight it out. My predecessor, Mr. Thomas, enjoys the respect and esteem of all who know him, and over will command it; his generosity and largeness of mind, his openness and truthfulness, are beyond question. Mr. Thomas has lost many thousands in the prosecution of this mine. Mr. Thomas has said to me, "Why not stop it; the branches are too small." Mr. Thomas has told friends of mine that but for Mr. Waddington the mine must have stopped. Thredneedle-street, Jan. 25.

H. WADDINGTON.

EAST CARN BREA.

SIR.—Holding a good interest in this mine, I concur heartily in the remarks of Mr. Laws in last week's Journal. Situated in one of the best districts of Cornwall, with Carn Brea on the west and Pedn-ar-dra on the east, surely the mine deserves a vigorous prosecution. The cross-cut now driving into Wheel Union will set many at any moment out a good lode, and place the concern at once in an excellent position. The best thing for East Carn Brea would be to convert it into a limited company, raise a capital of five or six thousand pounds, and sink both shafts with all possible speed. There would be few better speculations in Cornwall than this.

ADVENTURER.

NORTH TRESKERBY MINE.

SIR.—I am glad to find that "A Cornish Shareholder" confirms the opinion which I hold of Mr. Matthews' feeling convinced that the issue of his pamphlet was for the good of the shareholders, and I hope and trust they will take a more active part in the management of the mine, and see that the officials connected therewith do their duty efficiently; and I beg to call the attention of the shareholders to the reply given by Capt. Pryor to Mr. Matthews respecting the raising of 100 tons or more to pay off the debt referred to by Mr. Trevelthan—"I was not going to raise 100 tons of ore to put up the price of shares." As I have no reason to doubt Mr. Matthews' statement, I distinctly say that Captain Pryor should not be allowed to remain on the mine. What would any proprietor say if one of his officials were to say to him that he had no idea of using his exertions to promote the interest of the concern? I presume the answer would be that he should no longer require his services. I trust the shareholders will have a thorough investigation into the manner in which the mine is conducted. Jan. 24.

IRISH SHAREHOLDER.

NORTH TRESKERBY.

SIR.—How long is it since the Irish and Cornish shareholders in this mine (whose letters appeared in the Journal of January 14 and 21) have seen the late Purser? What a statement he made at Wheel Seton meeting—that 100l. per month could be saved by carrying out certain work 1200l. a year is an important item; so much so, that Capt. Thomas, the manager of Bolcoath, was called in to go into this question, and look at his report, which was sent to every shareholder. Now, another important question—How long will it be before the last new steam-whim erected at West Wheel Seton be wanted? Will it ever be really required? Would it not be advisable for the shareholders here to send in such a man as Capt. Thomas to go into this and other questions, and to report fully to the shareholders? It must be highly satisfactory to all the shareholders of North Treskerby to know that Capt. Thomas has thoroughly inspected this mine recently for the lords. This is what the manager, Capt. Pryor, has been advocating—that the lords might send in their independent agent, in order that they might not be led astray by false rumours and fictitious reports.

A SHAREHOLDER.

PRINCE OF WALES MINE.

SIR.—I do not see by Capt. Gifford's reports that he has resumed operations in the 55 cross-cut, north of Watson's engine-shaft. Is he afraid to cut a rich lode? Does it not look strange that a cross-cut should have been driven north of the shaft some 60 fms., and cut a branch which has been opened on west of the cross-cut some 20 to 25 fms., and then to start driving still further north, when in the cross-cut there is a large stream of copper water, which is certainly coming from the lode? Why is it that this important point has been abandoned for the last few months? It looks as if the agents were afraid to cut through the lode, for fear of cutting a good bunch of copper or tin. Surely, the committee of management, or the agents of the mine, ought to have this point accomplished at once. Will Capt. Gifford say why it is not done? Callington, Cornwall.

A MINER.

[For remainder of Original Correspondence see to-day's Journal.]

ON RECENT IMPROVEMENTS IN TIN DRESSING.

BY J. H. COLLINS, F.G.S.

After a long period of quiescence in stamping machinery, it is refreshing to see that attempts at improvement are at length being made in several directions. The tin obtained by the earliest Cornish miners was probably at first bruised down by hand, and there are evidences of this still to be seen in the neighbourhood of Helston as well as in other places. This rude method was most probably in use until a little more than two hundred years ago, when a member of the Godolphin family invented and applied the first "stamps," which like many at the present time were worked by a water-wheel. The next improvement was the introduction of "fire stamps," within the present century. These were at first met with much opposition, the old tanners declaring that the tin would not be so well stamped, and this objection is still occasionally heard from tanners of the old school. Within the last forty years various minor improvements have been, from time to time, introduced—as, an increase in the weight of the stamp-head, a more rapid motion, rollers to reduce the immense loss of power by friction (these, however, have mostly been abandoned, although it is not easy to say why), &c. Several attempts have also been made, with more or less success, to grind the stuff, instead of stamping it, especially to grind the "roughs."

Within the last eighteen months, however, a great amount of attention has been given to the subject by several engineers of eminence. The first idea seems to have come from America, the first "pneumatic stamps" having been invented there. These stamps were then improved upon by Mr. Husband, of Hayle Foundry. A trial of one of his improved stamps, consisting of one head, the head and lifter together weighing 240 lbs., took place at Hayle Foundry, on the 21st of April, 1870, in the presence of Capt. Quantrell, of Trumpet Consols; Captain Harris, of Great Wheel Vor; G. Eustice, C.E., and other gentlemen interested in mining. The stuff used was from Great Wheel Vor, the usual hardness and size of the stuff stamped at that mine, which is believed to be about equal to the average of the county. The stamp worked without intermission, giving 180 blows per minute. The quantity stamped was 21 cwt., which occupied 2 hours 15 minutes, or, equal to 11 tons 4 cwt., per day of twenty-four hours, which is at least ten times the quantity stamped by the ordinary stamps of the county. The working of the machine throughout the trial was in every respect satisfactory, and at its conclusion every bearing was quite cool and in perfect order.

The next attempt originated with Capt. Polglaze, of Goonbarrow Mines, who proposed to apply the direct-acting steam-hammer to this new use. This has been satisfactorily worked out in the patented machine of Messrs. Chatwood and Sturgeon, of Bolton, which machine was tried at Goonbarrow on Dec. 17. A full account of the trial appeared in the *West Briton* and the *Mining Journal*, but the results were briefly as follows—1 ton of the Goonbarrow stuff was put into the machine and stamped through in 37 minutes, including several stoppages from insufficiency of steam. The stuff is a partially decomposed granite, such as ordinary stamps would bring down at the rate of about 35 cwt. per day of twenty-four hours. The machine is, therefore, equal to about 44 stamp-heads under the circumstances of the trial.

Taking into consideration, however, the insufficient supply of steam—a 2-inch pipe being fitted to the boiler instead of a 3-inch, which would be of more than double the capacity—it is probable the machine will turn out to be equal to much more than this. No estimate of the cost of working seems to have been made with either of these machines. It would not be difficult, however, to estimate within a little what quantity of steam was used at Goonbarrow. The average pressure of steam was about 45 lbs. per square inch, the number of blows averaged 100 per minute, and the average length of stroke was 10 inches. The area of the cylinder, filled for the down-stroke, is 113 in.; that for the up-stroke, 85 in.; this gives for the quantity of steam used for each blow 1980 cubic inches, and for the total quantity of steam used 7,326,000 cubic inches, or (say) 4240 cubic feet, at 45 lbs. pressure. The steam lost within the cylinder by condensation would, perhaps, equal the amount saved during the stoppages. This quantity of steam would be yielded by the evaporation of 7 cubic feet of water. A well-constructed Cornish boiler, of 15-horse power, would, therefore, be amply sufficient; and if in such a boiler 8 lbs. of water were evaporated by each 1 lb. of coal, the quantity of coal used would be about 57 lbs. per ton of stuff crushed. More coal was used in the trial at Goonbarrow because the boiler-power was less than one-half sufficient; the fires, therefore, had to be continually forced, and much of the heat went up the chimney; a large amount of priming was, of course, another result of the inefficiency of the boiler for the purpose.

Another direct-action steam-stamper is now being constructed by Messrs. Willoughby, of Plymouth and Redruth, which is shortly to be tried at Wheel Vor, while Mr. Husband's patent atmospheric stamps will be at work very soon at a mine in the vicinity of St. Columb.

Still another machine of the same kind is already at work at the Gawton Copper Mines, near Calstock; it consists only of an 8-inch cylinder erected perpendicularly, with covers, stuffing-boxes, and piston-rods at each end. The lower piston-rod is 3 inches in diameter; to this the stamp head is attached, and works in a coffer with gratings, as usual. The upper piston-rod is 1½-inch in diameter, and carries a projecting clamp, which sets the slide-valve in motion. This very simple stamper gives from 40 to 160 blows per minute, the power of each blow being calculated by the inventor at 20 cwt.

Mr. Dingey's "pulviser" does not come into competition with these machines, but is rather an auxiliary to one or all of them, as it is intended to grind the "roughs." In former pulverisers a tendency was observed in the grinding parts to wear into deep circular grooves, which proved a great drawback. In Mr. Dingey's pulveriser this is impossible, as the grinding surfaces are continually changing their position with regard to each other. Four cast-iron plates of 2-feet diameter are made to revolve rapidly within a circular dish of 6 feet, which moves slowly in reverse direction. The stuff enters in the centre of the machine, and is carried between the grinding surfaces by means of a number of grooves cast in the upper and smaller discs. As soon as the stuff is sufficiently reduced it passes out through a number of stamp grates fixed in the edge of the lower revolving dish. The motion is conveyed from the driving engine by a belt, while the discs are made to revolve by toothed gearing.

It is certainly a sign of health that so many new plans are being tried, and it is satisfactory to hear that the Royal Cornwall Polytechnic Society has so far approved of three of the plans, those of Messrs. Husband, Chatwood and Sturgeon, and Dingey, as to award to each their first-class silver medal.

THE TREASURES OF NEW MEXICO.

Your readers are already familiar with the main features of the astonishing discoveries of silver in the Burro, or "Jackass" district, a region of country where there is neither wood nor water, situated between the Burro and Chiricahui ranges of mountains, just off the usual route from Mesilla, on the Rio Grande, to Tucson, the capital of Arizona. The ore consists chiefly of blue and black sulphates of silver, and is also rich in gold, assaying from \$40 to \$2500 per ton. The three principal ridges of ore are 50 ft. wide, and project above the surface from 40 to several hundred feet high. When the news of the rich "strike" reached Tucson, and was confirmed, nearly the entire population, including Gov. Safford, Sylvester Mowry, Coles Bashford, and a few Mexican women, went out to the mines to fix locations. The following are the names of the principal locations on the big croppings. On what appears to be the longest outcropping ledge, which is over two miles in length, the locations are, consecutively—Apache Chief, Freestone, Safford, Capital, Mustang, Harpending, Valley, Kate, Minnesota, Kentucky, Mohawk, Monte Grande, Salina, Forest, Bowman. This lode is known as the Harpending lode. The Brown lode comprises the Mohawk, Ophir, Roberts, Brown, Harris, Brown, Jackson, Potosi, Lee, Jefferson, and Washington locations. The Arnold lode takes in the Dip, Dunn, Arnold, Cooper, Eclipse, and Getty. A magnificent location of 1200 ft. was named in honour of General Thomas, who had promptly furnished the party with escort; and an adjoining location of 400 ft. was named for the noted pioneer, John Thompson. A few words concerning this well-known western man may be read with interest. He crossed the Plains in 1843. From Oregon he went to California, made a trip to the Sandwich Islands, and returned to San Francisco to build the fourteenth house erected in that city. One of Thompson's neighbours tried about the time to sell him a rancho a little way from town for \$1500, \$500 cash and liberal time for the balance, but he declined. That rancho, or rather the ground where it was, is worth today between \$7,000,000 and \$8,000,000. Thompson has had his ups and downs, like all old Californians, and all his old friends, among whom he includes General Fremont, will rejoice to hear of his good luck at last. The location was made in his name for him by his nephew.

The town of Ralston contains several hundred inhabitants, but progress, except in a speculative way, must be slow, as there is not water sufficient for mill purposes near the mines. The Gila River, 25 miles distant, affords the best opportunity for the erection of stamp-mills. The grade is good from the mines, and it is probable a railroad will be built after a few hundred tons of ore are crushed, to prove its value. As it is now, the ore, if selected, can be hauled to the Gila, and made to pay largely: \$500,000 will build and stock this road; another \$500,000 will put up six 40-stamp mills on the Gila; and this \$1,000,000 will be undoubtedly returned to the investors within 12 months after the mills and road are completed. The Burro region is not a country for a poor man, and those who have come here have literally had "a hard road to travel." Until mills are erected, a quartz country, in an agriculturally barren region, is the worst of all bad countries for a man without money.

It intensifies the excitement concerning the mines of this section that several square miles of country at Cienega have been discovered to be extremely rich in chloride ores. These ores were what brought White Pine into such favour as "the poor man's country," for chloride ores are nearly as easily taken out as tough clay, and they are readily worked in the mills. They produce from a few hundreds to many thousands of dollars per ton. Two men can pick out a ton of chloride in a day, when favourably situated for working, and would not be long in making fortunes while the chlorides last. The "country rock" is here, as at White Pine, limestone; and I may add that the position and general appearance of the mineral deposits of the two sections are analogous, though these are far more extensive. Some of the ore here has over 80 per cent. of its weight in pure silver. The district has been named the Chloride District, and a town called Silver City is fast building. At Pinos Altos, 10 miles from Silver City, gold placers have been recently discovered. The Cienega is about 40 miles from Ralston, and is a fine stream, sufficient to supply two steam stamp-mills. The mountain ranges through these sections of New Mexico and Arizona are the same as those which, southward in Chihuahua, Sonora, and Durango, have yielded such immense amounts of silver for centuries, and as those which, still further to the north, in Nevada and other territories, are proving so exceedingly rich. The Carmen vein, in Chihuahua, has produced enormous quantities of silver. Three masses of malleable silver, in a pure state, were once taken from this vein, together weighing 870 lbs.

The mines of Santa Eulalia, in Chihuahua, a short distance to the south of this place, are the most northern mines of any in Mexico which have been worked with regularity. By the richness of their ores they have proved the superiority of the northern mines of Mexico over those of the interior and south. The registered yield of these mines from 1705 to 1737 was \$55,959,750, or an average of \$1,748,742 per annum; from 1737 to 1791 the yield exceeded \$4,000,000, making a total for 86 years of \$100,000,000. This district was abandoned in 1800, on account of the incursions of the Apaches; and the fine haciendas for reducing ores, which were then in such a flourishing condition, have gone to ruin. The Mexican Government was so torn by civil strife that it had no time to aid the miners in quieting these disorders, and thus the tantalising wealth of Mexico's northern mines, and the rich tracts of Arizona and New Mexico, have remained undeveloped to the present day. An expedition, made by some Mexican buscones (prospectors) into Arizona, about the beginning of the present century, will illustrate the richness of the region. On their return, this party brought wonderful accounts of its wealth, and, as proof, 4033 lbs. of pure silver, one mass of which alone weighed 2700 lbs.—the largest mass of pure silver ever found in the world. This fact is well substantiated by the record. The royalty claim being disputed by the prospectors, a long and vexatious suit followed, resulting in a decree of Philip V., dated Aranjuez, May 28, 1741, which terminated a prosecution by the Royal Fiscal against these Arizona explorers. The decree gives the weights of the balls, sheets, and other pieces of silver discovered, and ends by declaring Arizona to be royal property as a *Criadera de Plata*, or place where, by some natural process, silver is created.

The richness of the ores and the geological position of the mines of New Mexico and Arizona give them a most decided advantage

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